Running Head: Cost and Access in Obstetrical Services

The Coalescence of Cost and Access in Obstetrical Services for a Downsizing Naval Hospital:

A Graduate Management Project

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The views expressed in this presentation are those of the author and do not reflect the official policy or position of Baylor University, Department of the Navy , Department of the Army, Department of Defense, or the U.S. Government.

Statement of Ethical Conduct in Research

The data source for this research study is the Military Health System (MHS) Management Analysis and Reporting Tool, referred to as the MHS Mart (M2) and the Managed Care Forecasting and Analysis System (MCFAS). No personal information that could be used to identify a research subject was obtained during the course of this study.

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Abstract

Naval Hospital Cherry Point (NHCP) has been mandated to shut down its inpatient services. The most demanded inpatient services are obstetrics (OB). The purpose of this study is to determine the optimal balance between the cost and access to OB services for the NHCP beneficiaries. Utilization rates as well as population size and location were analyzed for stability. Cost data were calculated for services both within the Military Treatment Facility (MTF) and civilian network. Six cost models were built which played out five scenarios. The most costly model is the status quo, while the least expensive is purchasing all OB care from the network. The most beneficial model will be a mixed model which incorporates MTF and purchased care.

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History

All organizations, both public and private, are affected by change. Over time, strategic management has become the primary method of dealing with change by coordinating the best fit between the organizations internal situation and the external environment. By focusing on the external environment, it is possible to take advantage of new opportunities and mitigate potential troubles (Ginter, Swayne, & Duncan, 2002). At the end of the largest military build-up in US history, it became clear to the Department of Defense (DoD) that it was time to reevaluate its assets now that the Cold War was predictably over.

In 1988, a commission reported assessment and recommendations concerning Military Base Realignment and Closures (BRAC) to the Secretary of Defense. The process was criticized for being too secretive because all votes were conducted in closed sessions and tended to favor the congressional districts of the ruling political party. These issues, along with the need for independent oversight prompted the Congress to pass the Defense Base Closure and Realignment Act of 1990, still referred to today as BRAC. The new law outlined procedures, rules, and timelines for several Government agencies and offices, including the President, Congress, DoD, Government Accountability Office (GAO), and the BRAC Commission (BRAC, 2005).

The next three rounds of BRAC occurred in 1991, 1993, and 1995 respectively. Interestingly, all of these commissions happened in non-election years in an attempt to prevent the influence of partisan politics from interfering. Most recently, the 2005 BRAC reviewed and forwarded their final report recommending, among other things, the closure of inpatient services at Naval Hospital Cherry Point (NHCP) to the President. On November 8th, 2005, the Congress approved the recommendations and passed them into law. As a result, the transformation process of Cherry Point into a Naval Health Clinic was initiated.

Background

Naval Hospital Cherry Point is a 23 bed inpatient facility located aboard the Marine Corps Air Station (MCAS) Cherry Point in Havelock, NC. This rural facility is approximately 130 miles southeast of Raleigh, NC (see Figure 1.). A relatively new facility, commissioned October 3, 1994, NHCP provides medical and administrative support to the 2nd Marine Aircraft Wing (2nd MAW), the MCAS, the Naval Aviation Depot (NADEP), and other tenant activities. The hospital is staffed and equipped to meet the primary medical needs of approximately 15,000

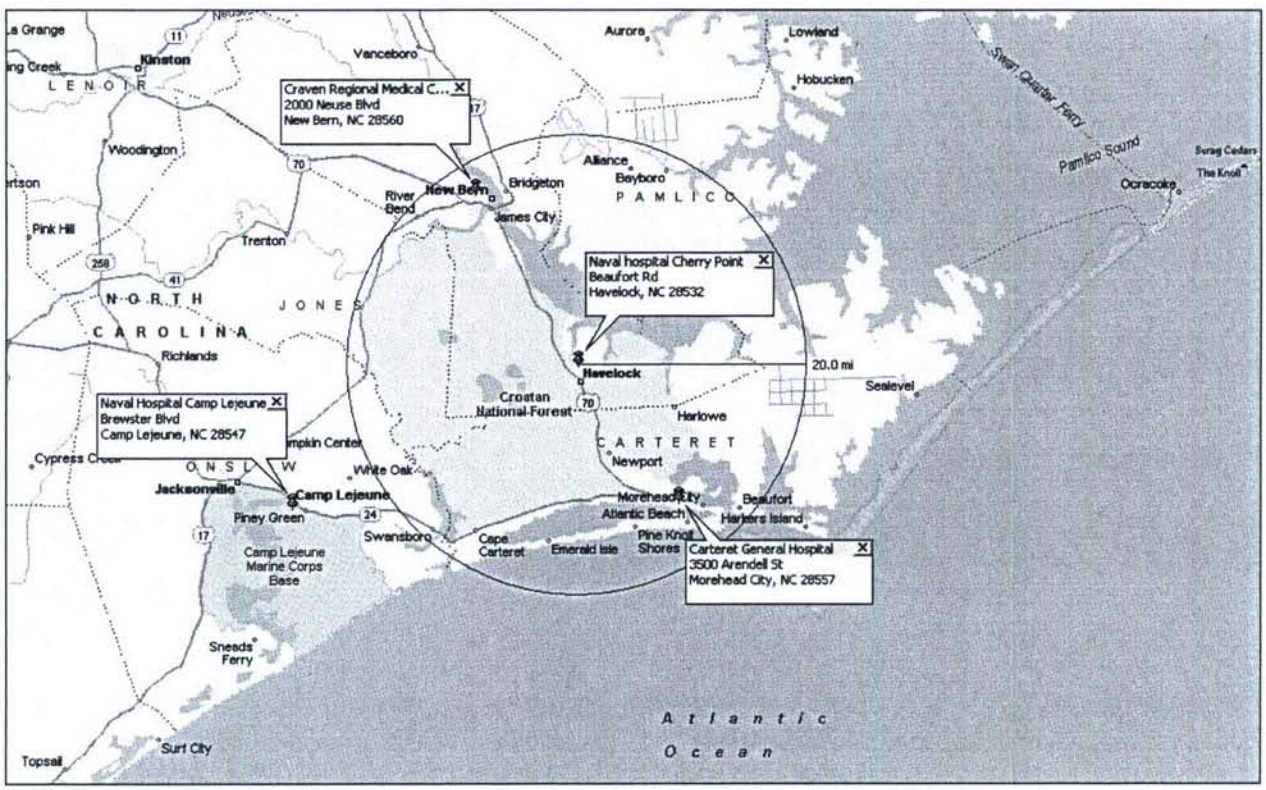


Figure 1. NHCP and surrounding local medical facilities

enrolled beneficiaries as well as eligible personnel in the Cherry Point-Havelock area (NHCP, n.d.). Three other medical facilities are located nearby that serve as primary referral points for additional care when needed.

Naval Hospital Camp Lejeune (NHCL) is located aboard Marine Corps Base (MCB) Camp Lejeune just outside the city of Jacksonville, NC, approximately 45 miles west of NHCP.

The hospital is a fully accredited 117 bed hospital with four inpatient areas, an Ambulatory Procedures Unit, six off-site medical support facilities, and a number of specialized clinics throughout the MCB. Construction of the newest part of the facility was completed in February 1983. NHCL provides medical and administrative support to Marine Forces Atlantic, 2nd Marine Division, II Marine Expeditionary Force, 2nd Force Service Support Group (FSSG), MCB, MCAS at New River, and numerous other tenant activities. The hospital primarily offers general clinical and hospitalization services for its 30,000 enrolled beneficiaries comprised mainly of active duty and retired personnel and their families (NHCL, n.d.).

Craven Regional Medical Center (CRMC) is located in the city of New Bern, NC which is approximately 20 miles north of NHCP. This 313 bed, full-service facility includes a wide range of inpatient services providing care to 15,000 inpatients each year (CRMC, n.d.). The facility is a member of the TRICARE network; however, the obstetrics (OB) group, Eastern Carolina Women's Center (ECWC), which operates from the facility is not affiliated with TRICARE at this time. Of the 11 sole community hospitals in North Carolina, both CRMC and Carteret General are listed among them.

Carteret General Hospital is an acute care 117 bed hospital located in the coastal community of Morehead City, NC that lies 17 miles south of NHCP. It provides a full range of acute care, diagnostic and outpatient services. The facility average 87 inpatients each day and performs over 410 surgeries each month (CGH, n.d.). The facility is currently not affiliated with TRICARE, however the OB group that operates there is a network provider.

Problem Statement

Naval Hospital Cherry Point has been mandated to downsize by closing its inpatient services. It is the responsibility of the MTF to procure services that can not be provided by the

MTF. To determine which service would be the most demanded after the downsizing, an analysis of the inpatient workload was conducted (see appendix A). The analysis revealed over 80% of the admissions, and nearly two-thirds (65%) of the workload are generated by the OB product line. In order to effectively plan for the transition, a decision must be made on behalf of the NHCP OB stakeholders, regarding where they will receive their care in the future.

Literature review

TRICARE Reimbursement

For care that is purchased from the civilian network, payment is made to either hospitals in the form of facility charges or to providers as professional fees. An inpatient stay will usually incur both payment types. Facility charges include all the costs associated with the hospital during an inpatient stay. These include charges for products and services such as ancillary services (laboratory, radiology, and pharmacy), hospital staff, food, hospital employed providers, and even a share of the electric and cleaning costs of the facility. TRICARE, similar to Medicare and Medicaid, uses a Prospective Payment System (PPS). This concept means the amount paid by TRICARE for an episode of care is predetermined and based on the diagnosis upon admission. The admission diagnosis is also called the Diagnostic Related Group (DRG). The amount paid is not necessarily static and can be adjusted based on, among other things, local labor costs and the type of hospital (e.g., teaching, children's). Using the prospective form of payment method, the facility assumes the risk that the patient will not stay beyond or need more than the average amount of care. If so, the hospital is responsible beyond the set payment amount. For this reason, many facilities either do not accept, or limit the number of patients who finance healthcare in this fashion. To be exempt from this payment methodology, a hospital must qualify as a sole community hospital under the rules set by the Centers for Medicare and

Medicaid Services (CMS). Once in this status, hospitals receive reimbursement for billed charges. The maximum amount TRICARE will pay for any given DRG is referred to as the CHAMPUS Maximum Allowable Charge (CMAC) rate, and sole community hospitals can be reimbursed up to 115% of that amount (TRICARE Reimbursement manual, 2002b).

Professional fees are paid to the provider in return for the services and procedures that were rendered. In the case of OB, the fees are bundled into an all-inclusive global maternity fee (GMF). This fee is intended to cover all of the professional services which are normally provided for routine pregnancies. These services are defined as prenatal visits, vaginal delivery, and postpartum care. For situations that fall outside of the norm, exceptions exist to the GMF. These exceptions are for procedures or tests that are deemed medically necessary, they can be billed separately and will most likely be paid (TRICARE Reimbursement Manual, 2002a). Using the Military Health System (MHS) Management Analysis and Reporting Tool (M2), a review of 2005 OB network claims data for NHCP enrollees revealed these additional fees amounted to approximately 9% of the average GMF.

Utilization

Inpatient obstetric care is coded into one of six DRGs (370 – 375) (see appendix B for detailed definitions). Using data retrieved from the M2, a review of 2002 to 2005 deliveries was conducted to obtain the historical delivery mix for both the NHCP and the network (see Table 1). The Managed Care Forecasting and Analysis System (MCFAS) was used to build a beneficiary forecasting model that predicts enrollment for the NHCP Prime Service Area. Figure 2 shows the Beneficiary Categories (BENCAT) Active Duty/Guard (AD) and Active Duty Family Member (ADFM) enrolment projections through 2011.

Menacker, in conjunction with the Centers for Disease Control and Prevention (CDC),

released a report outlining the overall upward trend of cesarean rates in the United States (2005).

Table 1

Distribution of MTF and network births by year and DRG

DRG	2002	2003	2004	2005	Total	%
370	31	25	23	29	108	.05
371	115	121	91	104	431	.18
372	135	142	157	129	563	.24
373	271	298	288	340	1197	.51
374	9	6	7	17	39	.02
375	0	1	0	1	2	-
Total	561	593	566	620	2340	-

Lowering the cesarean rate was originally listed as an objective for Healthy People 2000, but the dramatic rise in rates between 1996 and 2000 caused it to remain a Healthy People objective, this time for 2010. By 2003 it had risen to 27.5% of all births from the 1996 low of 20.7%. When

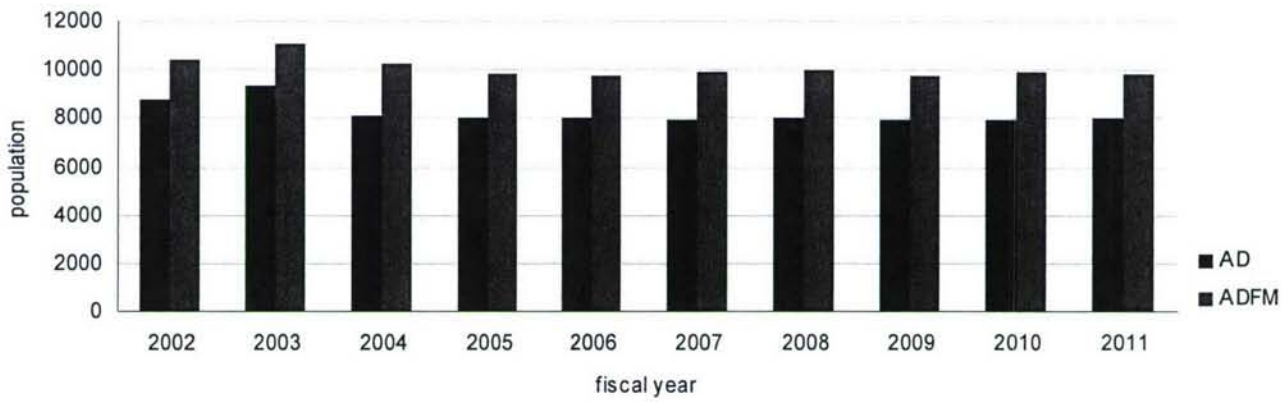


Figure 2. Ten year MCFAS forecast of Active Duty and Active Duty Family Member enrolment populations for NHCP

compared to the national average, NHCP has a relatively low rate of cesarean births, approximately 18.3% of all births in 2005 (Feldman, 2005). For various reasons, a portion of cesarean deliveries are scheduled vice emergent. Clinical coding does not specify this level of

detail for analysis. The NHCP Labor and Delivery nursing station, on the other hand, does record this type of information. At the station the head nurse maintains a birthing log book which was used to gather the data from FY 2005. The ad hoc analysis concluded that 35% of NHCP cesareans were scheduled in advance.

An additional facet of utilization pertains to maximizing resources. Patient and procedure volume is frequently associated with clinical outcome. A rigorous review of the literature by Halm, Lee, and Chassin found that although there are associations between volume and clinical outcome, the strength of association varies widely among the studies (2002). Additionally, they showed that where correlation can be made, volume is not a decent predictor at the provider or institution level. The study by Garcia, Miller, Huggins, & Gordon agreed with findings of Halm et. al., and showed that there were very strong positive relationships between patient volume and resource utilization (2001). This finding is supported by the production principle economies of scale which lowers overall costs by distributing fixed costs over a greater number of services.

Resource Sharing

Resource sharing is a program available to local MTF commanders which allows them flexibility and creativity in their pursuit of increasing access and controlling costs at the MTF level. Two forms of resource sharing exist, internal and external. The internal resource sharing model has non-government employed providers seeing MHS eligible patients within an MTF. The focus of this study is the external resource sharing agreement (ERSA), which sends military providers to practice their specialty in a civilian facility. The program has been around since before the 1993 inception of TRICARE (TRICARE Operations Manual, 2002). Despite its tenure, the program has remained a challenge to institute and maintain.

In 1994 a commissioned study was released which criticized the lack of analytical tools

and data available to the MTFs to properly evaluate the potential for such agreements. That same report noted the potential these agreements might have in leveraging reluctant hospitals into joining the provider networks (RAND, 1994). The Assistant Secretary of Defense for Health Affairs issued a memorandum (1996) to the service Surgeon Generals reiterating the TRICARE policy that resource sharing agreements should be the first alternative when attempting to recapture workload which has leaked to the network.

The GAO reported on the TRICARE resource sharing plan and noted MTF commanders had not been properly outfitted with tools and policy to make the system work. Additionally, although there were savings for the MHS as a whole, some MTFs were losing money, especially in ancillary costs which could not be recovered (1997). The ancillary expense problem resulted from the civilian providers in the MTF not being charged for the ancillary services which they consumed. Lastly, the DoD had predicted resource sharing would reduce the healthcare budget by $700M over five years. This was shown to be grossly overestimated and that after 9-24 months (depending on region) only $36M in savings had been realized (GAO, 1997).

Currently, most of these issues have been resolved. Military Treatment Facility staff now has access to huge data warehouses (e.g., M2, MCFAS, EAS-IV, etc.) which allow analysis to be conducted across multiple dimensions (cost, workload, time, network leakage, etc.). Additionally, the costs for ancillary services can now be charged from the MTF to the contractor to offset the additional cost or providing overhead (TRICARE Operation Manual, 2002).

To enter into an ERSA, several conditions must be present. First, the facility must be in the TRICARE network. The MTF Commander, TRICARE network contractor, and the facility, in conjunction with the TRICARE Regional Director's concurrence, must agree to the details of the arrangement in writing. The MTF commander must ensure the military providers are

properly privileged and licensed as required. Malpractice insurance is not required for these agreements as the providers are considered to be practicing within the scope of their duties and therefore the US Government is responsible for their actions, including any liability which may be caused by neglect (TRICARE Operation Manual, 2002).

Several examples of ERSAs are currently available as case studies. The Naval Station at Newport, RI has been engaged in an ERSA with the local Newport Hospital for over 10 years. For MHS beneficiaries, all inpatient and after-hours care are seen by military providers at the Newport Hospital (NHCNE, n.d.). This serves the enrolled population well as the city is small and the population relatively condensed. Interviews with a former OB provider from that area illustrated the struggle to stay on top of patient care. The primary patient care issue was geographic, with providers having to make rounds in the civilian hospital while maintaining a full clinic schedule at their military clinic (personal communication with Dr. Dixon, March 3, 2006).

Naval Hospital Beaufort (NHB), SC is another facility which has adopted an ERSA. Unlike Newport RI, NHB currently maintains inpatient capability yet has shifted their OB workload to the local Beaufort Memorial Hospital to be seen by military providers. NHB is about to commence construction on a new facility due to deterioration of the existing hospital. As a part of the preparation, studies are being conducted to best determine how to recapture up to 80% of the OB market share back into the MTF (The Innova Group, 2005) (personal communication with LTJG Tres Newman, March 30, 2006).

Purpose

The purpose of this project is to recommend whether to pursue an ERSA for obstetrical care or purchase that care from civilian network providers. This is accomplished by identifying

and integrating both qualitative and quantitative variables into the analysis.

Methods and Procedures

This analysis was accomplished by building six models which encompassed five different scenarios. The ERSA scenario contains two models. Taken together, these scenarios represent the most likely directions that NHCP will take after closing its inpatient services. Initially, several constants were computed for use in the scenarios. These constants were the number and average cost per birth in both the network and within the MTF.

Number of births

The first step was to determine which BENCAT uses OB services. Data retrieved from the M2 indicated that between 2001 and 2005, 2,755 babies were born to NHCP enrollees. Of these births, 98% (n = 2,755) were to either Active Duty/Guard (AD) or Active Duty Family Member (ADFM). The remaining 2% (n = 60) were to other categories. For this reason, only AD and ADFM BENCAT populations are used in this study. Next, the NHCP enrolment population was projected using the MCFAS. A ten year span from 2002 to 2011 was compiled and divided by zip code and BENCAT. A cursory review of the data revealed a spike in the enrolment population around 2003 (see Figure 2).

To investigate the population spike, a 2 x 2 factorial Analysis of Variance (ANOVA) was performed. This test was chosen because of its ability to describe if the change was due to a shift in total population over time or a shift within a subset of the population (measured by BENCAT). The time series was divided into two categories, history (2002 – 2004) and forecast (2005 – 2011). The ANOVA test compared the groups time, population (AD and ADFM), and the potential interactions between them. The results showed the differences between time categories were significant, $F(1, 16) = 31.66$, $p < .001$; as well as population, $F(1,16) = 193.40$,

$p < .001$. No interaction was shown, $F(1, 16) = .017$, $p = .898$, which suggests the year differences affected both groups similarly. Because the history was not representative of the forecast, the most recent complete year's data was used as the basis for number of births. In 2005, NHCP enrollees gave birth to 511 babies inside MTF walls (anywhere in the MHS, not just NHCP), and an additional 109 babies were born in civilian hospitals, bringing the total births, to 620. This number was used as the multiplier against the costs in the various models.

Cost per birth

The network cost of a birth is largely determined by the type of delivery, that is, the DRG. This amount can then be divided between the facility charge (hospital fees), professional fees (in the case of childbirth, the Global Maternity Fee), and other fees. For the purpose of this study, other fees are defined as any professional fees that are paid outside the GMF. To arrive at the average cost per birth, a weighted average was used based on DRG occurrence.

Facility charges were retrieved from the M2 based on an admitting DRG of 370 – 375. There were no network claims for DRG 374 (Vaginal Delivery W Sterilization &/Or D&C) in the M2. To assure the most conservative analysis, the 2% of births which were DRG 374, were added to the DRG 371 as it computed to be the most costly.

Professional fees were also retrieved from the M2 and were based on the encrypted patient ID field from the facility charges query. These data were then refined in several ways. First, any charges that occurred beyond 45 days of hospital discharge (traditional final post-partum check-up) were discarded as this is normally indicative of a new episode of care. Additionally, the data were divided into two groups, the charges which posted during the inpatient stay were designated as the GMF, and those that posted outside were considered other fees. Current billing practices concur with this methodology as the GMF is routinely charged at

the time of birth. The data again concurred with the rationale as the bulk (91%) of the professional fees were in fact assessed during the inpatient stay. Also, any of the additional professional fees which carried a product line code other than OB were excluded as those services were potentially not related to the pregnancy. Lastly, all the charges (facility, professional, and other) were adjusted by the Incurred But Not Recorded (IBNR) factor reported

Table 2

Network costs for deliveries

	DRG			
	370	371	372	373
Average Institutional Fee	$5,667	$6,169	$3,731	$2,783
Average Global Maternity Fee	$2,092	$2,300	$1,923	$1,556
Average Other Professional Fee	$62	$145	$111	$252
Average Total by DRG	$7,821	$8,614	$5,764	$4,591
distribution of births (weight factor)	.05	.20	.24	.51
Weighted average Institutional Fee	$283.37	$1,233.80	$895.50	$1,419.20
Weighted average Global Maternity Fee	$104.58	$460.05	$461.43	$793.69
Weighted average other Professional Fee	$3.09	$28.98	$26.54	$128.76
Weighted averages by DRG	$391.05	$1,722.83	$1,383.47	$2,341.65
Total weighted average per network birth				$5,839

in the M2. This modifier is used to adjust the total cost and is based on the average amount of outstanding claims of the same age and type which were pulled. To compute the weight factors for the cost formula, the distribution of DRGs which was computed earlier and displayed in Table 1 were used. Table 2 shows the result of the cost formula.

The cost associated with direct care in the MTF can be accessed from various databases,

both centralized and local. Because this study compares costs across MTFs, the author decided to

Table 3

MTF Cost for deliveries

Ambulatory	**NHCP**	**NHCL**
Clinician's Salary	$312	$168
Lab	$200	$97
Other Ancillary	$235	$58
Other Salary	$656	$193
Pharmacy	$167	$86
Radiology	$82	$13
Other Costs	$659	$380
subtotal	$2,311	$995
Inpatient		
Clinician's Salary	$475	$264
Direct Cost	$269	$1,428
Lab	$72	$53
Other Ancillary	$1,053	$592
Other Salary	$5,111	$1,351
Radiology	$7	$2
Support	$1,893	$1,870
Surgical	$465	$526
subtotal	$9,345	$6,086
Grand Total Cost	**$10,004**	**$6,466**

standardize the data source for this study as much as possible by using the M2. The following data were retrieved for both NHCP and NHCL in its most granular form. These values were then

divided by the total births at the respective MTF to give the approximate per-birth cost of a delivery (FY2005 MTF births: NHCL $n = 1433$, NHCP $n = 511$).

Inpatient costs were retrieved from the Standard Inpatient Data Record (SIDR) in the M2 for 2005 using DRGs 370 – 375. Ambulatory costs were retrieved from the Standard Ambulatory Data Record (SADR) in the M2 using the International Classification of Diseases Ninth Edition (ICD-9) diagnosis codes V22 to V24.2 (these cover all prenatal and postpartum care). These figures are presented in Table 3. The cost data, along with the number of births were used as the building blocks for the various models within the scenarios.

Defining the scenarios

The details of an ERSA are unknown until the contracts are signed. This unknown makes it more practical to build two opposing models for that scenario. Other models included in this analysis are a status quo, a complete shift to NHCL, a mix of NHCL and purchased care, and a network purchase model.

Model 1: ERSA 0% GMF.

This model assumes the total avoidance of network professional fees. This is accomplished by performing all ambulatory care provided at NHCP, and using MTF providers to deliver babies at CRMC. NHCP will no longer have inpatient capability therefore the full facility charges will be incurred for each birth. Since all the deliveries occur at an outside facility, in addition to the current staffing, at least one additional provider will be required to cover call at CRMC. The cost of this provider is taken directly and in whole from the Standard Pay Reimbursement Rates memo (Office of the Under Secretary of Defense: Comptroller, 2005) and is based on the average OB provider paygrade of O4. The reasoning behind including the entire cost of the provider vice using the per delivery cost, is the provider on call at CRMC would not

be able to see any other patients (except MHS beneficiaries) and would therefore be unable to maximize their time in a productive way. The entire fixed salary is applied as a direct cost towards OB and deliveries.

Model 2: ERSA 100% GMF.

The 100% ERSA model assumes the opposite of the 0% ERSA, that is, NHCP will have to pay the GMF for every birth at CRMC. As mentioned, the details of an ERSA are the result of negotiation. Meetings with the medical leadership at CRMC give a strong indication that the ECWC will oppose the privileging of NHCP providers which allow them unbridled access to the facility. Once begun, negotiations would presumably conclude with number of births being awarded to the ECWC. Currently, no speculation has been made concerning how many births that might be, so this model is built on the worst case scenario of all of them. In essence the only cost avoidance in this model are the ambulatory, or other professional fees. Recall prenatal and postpartum care are included in the GMF. Because there is a large decline in the amount of work related to this model, a reduction in provider manning is included. Currently there are five providers to manage the NHCP caseload. If NHCP were to perform no deliveries, nor provide the prenatal and postpartum care, the assumption is staffing should be reduced to three. This figure is an estimate provided by the Department Head for Obstetrics and Gynecology and is accounted for in costs by discounting the clinician salary by 40% in the calculations (personal communication with Dr. Dixon, March 3, 2006).

Model 3: NHCP Status Quo.

The status quo model is what it cost NHCP in 2005 to perform all its OB requirements. No changes have been made. This model is included as a benchmark to compare the other models against.

Model 4: NHCL.

This model is a calculation of what it would cost NHCL to conduct all 620 NHCP births from 2005. The model is demonstrated for comparison reasons and is not necessarily a viable option as distance would make it less than desirable for most NHCP beneficiaries.

Model 5: network.

The network model assumes the purchase of all 620 NHCP births from the network. The OB clinic would be closed down and no prenatal or postpartum care would be provided at NHCP.

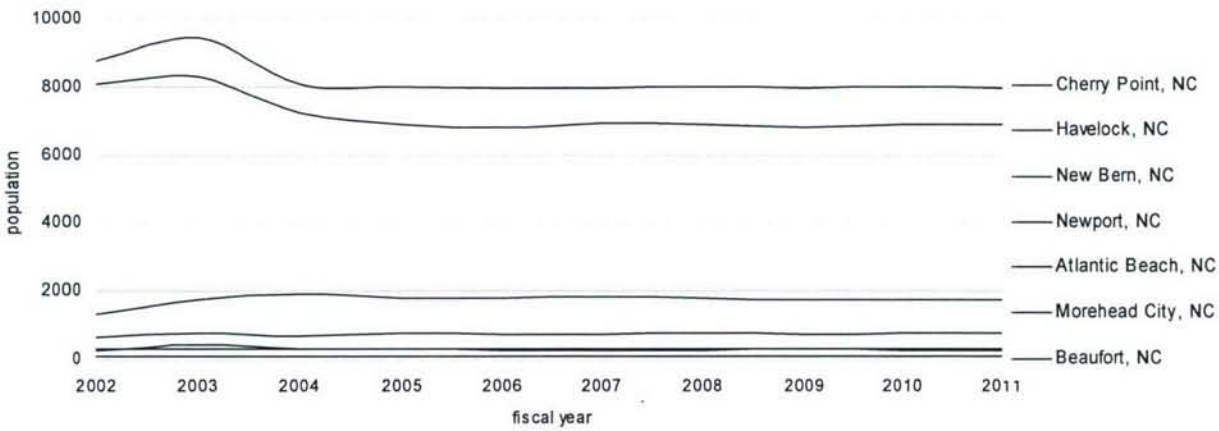


Figure 3. MCFAS ten year OB population (AD + ADFM) forecast of top seven most populated cities in NHCP catchment area

Model 6: NHCL-Mix

The NHCL and network mixed model (NHCL-mix) is a hybrid model that relies on referring some care to NHCL based on location and type of delivery. For those beneficiaries who live to the south and southwest of MCAS, NHCL is closer than CRMC and would require less travel time making access easier to their OB provider. Analysis of the MCFAS population data by zip code shows a stable distribution by location as well as size (see Figure 3). In 2005, 7.88% (n = 1,450) of the enrolled AD and ADFM population (n = 18,412) lived in areas either just as

close to Camp Lejeune, or within the NHCL 20 mile catchment area. This percentage equates to approximately 49 births a year. Figure 4 shows the distribution. Additionally, scheduled cesarean sections would be referred to NHCL which brings the total of referrals for NHCL to 89, the remainder of the births would be purchased in the network.

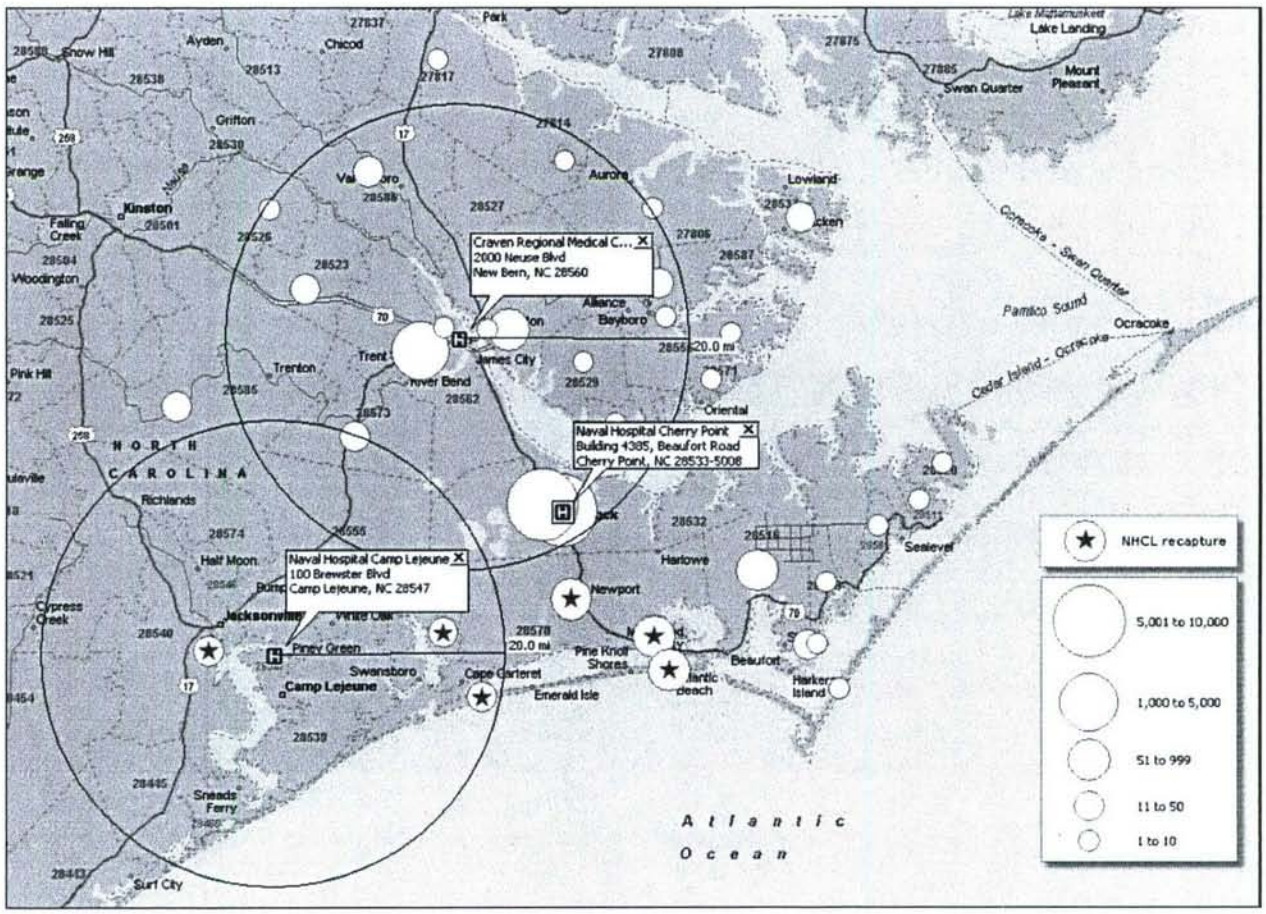


Figure 4. Potential referrals to NHCL areas based beneficiary on residence

Results

Figure 5 shows a comparison of the resultant cost models. Table C1 gives a cost breakdown for the three most expensive models, while table C2 shows the breakdown for the three least costly. Most notable is the exorbitant cost of the NHCP model. This model represents $1.7M more than the second costliest model (ERSA 100% GMF), and almost $3M more than the least costly (network). The two opposing ERSA models had a difference of just over $900,000,

and the two least expensive models, NHCL-mix and network, were separated by just $110,000.

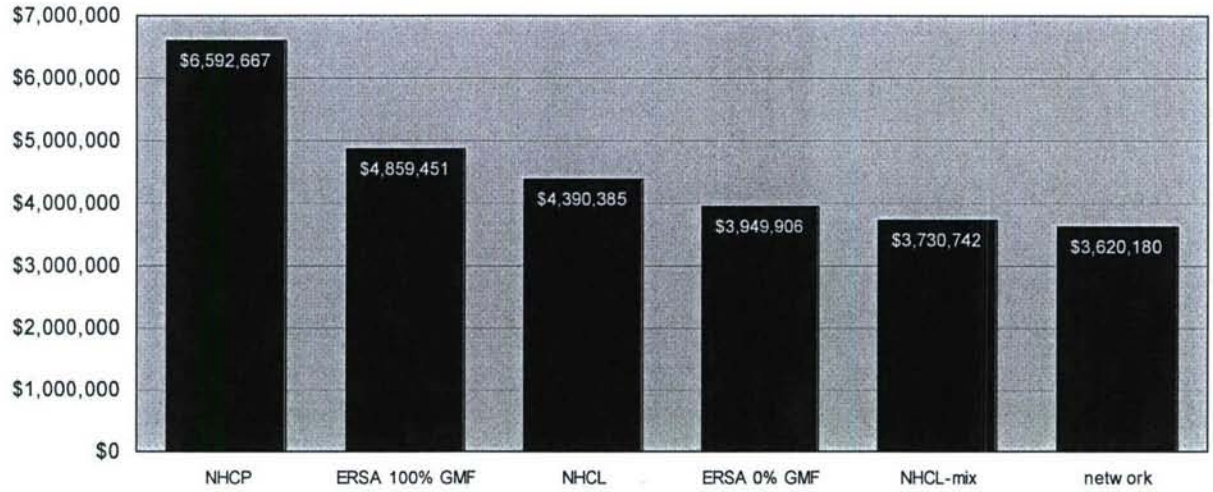


Figure 5. Results of cost model scenarios

Discussion

When looking at each scenario, there might be a tendency to conclude the model which costs the least is preferred. This methodology is flawed and should be avoided because cost should not be the sole factor in decision making when it comes to healthcare. An example is illustrated in the idea of a sole community hospital. To manage their disproportionately large overhead costs, rural healthcare facilities must charge more to provide the standard of care Americans have come to expect. Obviously cost is important, and if all other things are held constant and equal, then cost should be the deciding factor. When reviewing the scenarios here, it is important to take into account other variables which may provide a qualitative enhancement to healthcare.

The NHCP model is expensive. This model is also the most convenient for our beneficiaries. However since inpatient services are being discontinued, it is also a model with no future. Because this model was built solely for comparative reasons there is little to gain from

analyzing the benefits of it. There is however, potentially something to gain from looking at its problems. The question of why the costs are so much more for NHCP than NHCL is illuminated. Camp Lejeune is a larger hospital but does it enjoy the benefits of the economies of scale to the degree illustrated in this analysis? The potential exists for additional exploration and research into the cost accounting methods at NHCP. This research could lead to either discovering administrative errors or actual inefficiencies in the organization, either of which will make comparative cost analysis in the future better if corrected.

The primary purpose of this study was to research the financial feasibility for future OB services. The second costliest model is the ERSA 100% GMF model. The other ERSA model, 0% GMF was about $900,000 less expensive. Neither of these models were intended to be adopted, rather they were to serve as the anchoring points for the negotiations. They do however reveal that even if negotiations conclude to the greatest benefit to the government (i.e., adoption of the ERAS 0% GMF model), it would still cost $329,000 more than the network model. For every birth that is negotiated away from NHCP and given to CRMC, a savings of $532 is realized. This is counterintuitive and contrary to the traditional mindset of keeping work in the MTF. The question that needs to be asked is what added value do the beneficiaries receive by adopting this model? Many factors which have not been included in the calculation, but were mentioned earlier, play a role in the overall desirability of a model. Some factors are those concerning the tracking and administration of the contract itself as well as the licensing and certification differences between the MTF and civilian facility. Continuity of care is another. When an expectant mother develops a relationship with her OB provider, it is less than desirable to hand off care to another physician. Not only is this not patient centered healthcare, but it could also lead to legal consequences if unfavorable outcomes prevail.

Similar to the NHCP model, the NHCL model is meant to provide yet another yardstick for comparison. In this case, the distance to NHCL is simply too far to be considered a viable alternative for all the OB services needed from NHCP. In addition, NHCL is not large enough to handle the additional 600+ births per year generated at NHCP. Interestingly, this model resides at almost the exact half way point between the two ERSA models, which is where one might speculate negotiations would conclude.

The least costly scenario is the network model. The fact that purchasing OB care from the network is the most economical is not that surprising since most civilian healthcare facilities are streamlined for fiscal efficiency and are ultimately revenue conscious. Unlike NHCP and NHCL models, this model has the potential for adoption. Again, looking at costs, it appears the most desirable. There is the added benefit of simplicity, that is, when a beneficiary becomes pregnant, they are directly referred to the network for their complete care. This model also solves the continuity of care issue which was revealed in the ERSA models. The potential also exists to use this model to enhance the NHCP local network. If Carteret General gains knowledge of NHCP purchasing all births from the network, that might be enough enticement to get the hospital leadership to enter the TRICARE network, thereby offering additional choice to beneficiaries along with a cost savings to the government.

The hybrid NHCL-network mix model represents the greatest potential for all stakeholders. On the basis of cost it represents a 3% increase over the purchase all model. For that cost however, there are several offsets, optimization being one. Although NHCP would not directly realize the return, by sending high cost cesarean along with local beneficiaries to NHCL, this would be helping to optimize the NHCL staff and facility. Reducing empty beds and keeping the OR schedule full has the net result of lowering the overall cost for everyone. Access could

also be improved. As Figure 4 shows, many NHCP beneficiaries live closer to NHCL than CRMC and would have to endure less travel time during their entire episode of pregnancy. In addition to access for the mother, NHCL has a level II Neonatal Intensive Care Unit (NICU) and has built into their civilian network access to several level III NICUs. According to the National Center for Health Statistics (2004), rates of low birth weight (< 2500 g) have been trending upward since 1989, and was reported at 8.2% of all births in 2002. An internal study conducted at NHCP concurred with the CDC study, and showed 8% of NHCP births were pre-term (Feldman, 2005). Although infant costs were excluded form this study, clearly there are benefits to having this level of care readily available to the beneficiaries.

Recommendation

Transforming a hospital to a clinic by shutting down inpatient services is a daunting task because of both the magnitude and consequence of change. In fairness to the stakeholders, every angle of a problem should be considered to ensure the best decisions are made.

Given that OB is the overwhelming majority of the inpatient work performed at NHCP, it makes sense to begin the transformation analysis there. Basing military medicine decisions on cost alone is not necessarily a best business practice as there are more facets than expense, revenue, and return on investment. Using a holistic approach to solve the OB dilemma, it is clear that adopting the NHCL-mix model satisfies the most needs. Splitting the cases based on geography and delivery type between the civilian network and NHCL will yield the overall greatest return for the stakeholders.

Appendix A: FY 2005 Inpatient workload analysis

The following two pages represent various ways to view the inpatient work performed at NHCP in FY 2005. Although admissions and dispositions are convenient and handy figures to use in general conversation, Relative Weighted Product (RWP) is the unit of analysis used here because they are weighted and therefore a truer representation of resource consumption. This methodology leads to what may appear to be disparities or incorrectness in the data. For example, you will notice the DRGs (procedures) are in descending order of total RWP value, yet the *n* (the number of cases of that particular DRG) will seem out of order, this accounts for the increased complexity of some procedures over others.

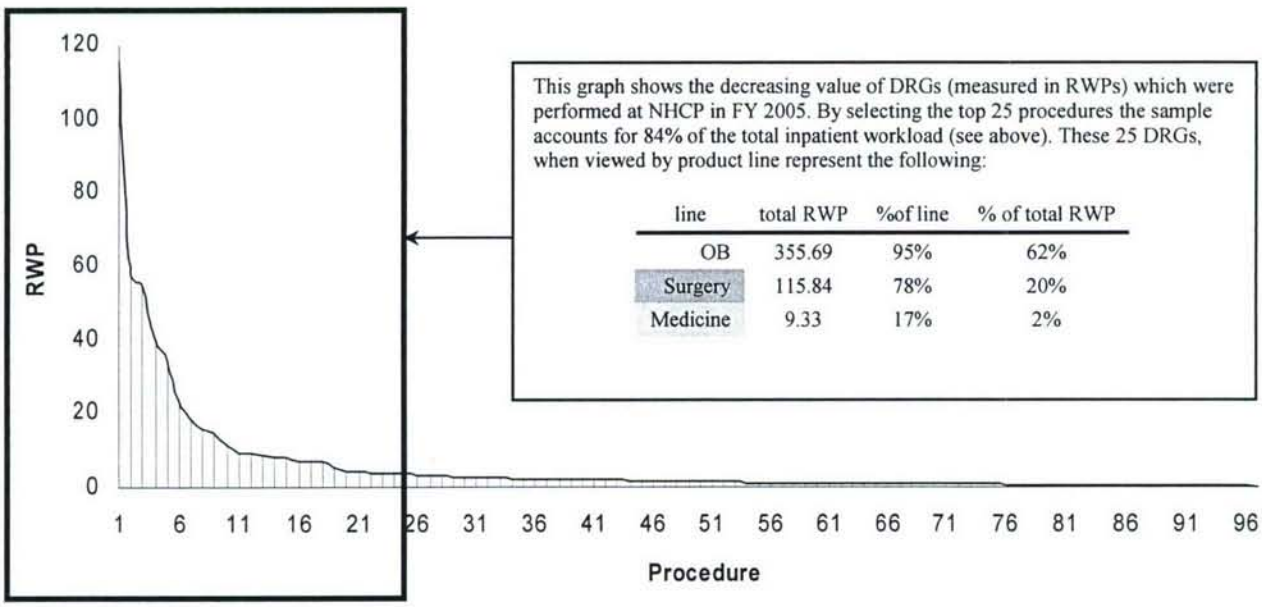
The main take away from this analysis is the fact that, although OB accounts for the overwhelming majority of our inpatient admissions (almost 80%), the total overall workload associated to the OB product line is 65%. Surgery accounts for 25% and Medical cases represent the remaining 10%. The fact that many of the services that support OB also concurrently support surgery and the medical product lines should be taken into account. This analysis did not look into the overlap of those support services.

Top 5 OB DRGs by RWP	RWP	*n*
Vaginal Delivery W/O Complicating Diagnoses	115.57	285
Cesarean Section W/O CC	57.94	80
Vaginal Delivery W Complicating Diagnoses	55.36	111
Normal Newborn	39.67	341
Neonate, Birthwt >2499g, W/O Signif Or Proc, W Other Prob	23.54	100
Total	292.08	917.00
% of total by product line	78%	88%
% of total production	51%	72%

Top 5 Surgery DRGs by RWP	RWP	*n*
Uterine & Adnexa Proc For Non-Malignancy W/O CC	34.16	36
Appendectomy W/O Complicated Principal Diag W/O CC	18.33	20
Other Ear, Nose, Mouth & Throat O.R. Procedures	15.96	11
Laparoscopic Cholecystectomy W/O C.D.E. W/O CC	9.18	8
Major Small & Large Bowel Procedures W CC	8.40	3
total	86.03	78
% of total by product line	58%	57%
% of total production	15%	6%

Top 5 Medical DRGs by RWP	RWP	*n*
Esophagitis, Gastroent & Misc Digest Disorders Age >17 W/O CC	5.58	9
Urinary Stones W CC, &/Or Esw Lithotripsy	3.75	4
Esophagitis, Gastroent & Misc Digest Disorders Age 0-17	2.99	9
Cellulitis Age >17 W CC	2.77	3
Postoperative & Post-Traumatic Infections	2.72	3
total	17.81	28
% of total by product line	32%	32%
% of total production	3%	2%

Top 25 DRGs by RWP	Product Line	RWP	*n*
Vaginal Delivery W/O Complicating Diagnoses	OB	115.57	285
Cesarean Section W/O CC	OB	57.94	80
Vaginal Delivery W Complicating Diagnoses	OB	55.36	111
Normal Newborn	OB	39.67	341
Uterine & Adnexa Proc For Non-Malignancy W/O CC	S	34.16	36
Neonate, Birthwt >2499g, W/O Signif Or Proc, W Other Prob	OB	23.54	100
Appendectomy W/O Complicated Principal Diag W/O CC	S	18.33	20
Other Ear, Nose, Mouth & Throat O.R. Procedures	S	15.96	11
Cesarean Section W CC	OB	14.84	17
Vaginal Delivery W Sterilization &/Or D&C	OB	11.40	17
Laparoscopic Cholecystectomy W/O C.D.E. W/O CC	S	9.18	8
Neonate, Birthwt >2499g, W/O Signif Or Proc, W Major Prob	OB	9.00	11
Neonate, Birthwt >2499g, W/O Signif Or Proc, W Mult Major Prob	OB	8.51	3
Major Small & Large Bowel Procedures W CC	S	8.40	3
Neonate, Transferred <5 Days Old	OB	8.31	24
Female Reproductive System Reconstructive Procedures	S	7.36	8
Other Antepartum Diagnoses W Medical Complications	OB	7.22	17
Major Male Pelvic Procedures W/O CC	S	6.91	5
Esophagitis, Gastroent & Misc Digest Disorders Age >17 W/O CC	M	5.58	9
Appendectomy W/O Complicated Principal Diag W CC	S	4.39	4
Threatened Abortion	OB	4.33	10
Perianal & Pilonidal Procedures	S	3.96	7
Urinary Stones W CC, &/Or Esw Lithotripsy	M	3.75	4
Other Digestive System O.R. Procedures W CC	S	3.65	2
Laparoscopic Cholecystectomy W/O C.D.E. W CC	S	3.55	2
Grand Total		480.86	1135
% of total production		84%	89%



This graph shows the decreasing value of DRGs (measured in RWPs) which were performed at NHCP in FY 2005. By selecting the top 25 procedures the sample accounts for 84% of the total inpatient workload (see above). These 25 DRGs, when viewed by product line represent the following:

line	total RWP	%of line	% of total RWP
OB	355.69	95%	62%
Surgery	115.84	78%	20%
Medicine	9.33	17%	2%

Appendix B: Terms and Definitions

DRG — *Diagnostic Related Group* - is a system to classify hospital cases into one of approximately 500 groups, expected to have similar hospital resource use, developed for Medicare as part of the prospective payment system. DRGs are assigned by a "grouper" program based on ICD diagnoses, procedures, age, sex, and the presence of complications or comorbidities.
DRGs specific to childbirth are:

370 Cesarean Section W CC
371 Cesarean Section W/O CC
372 Vaginal Delivery W Complicating Diagnoses
373 Vaginal Delivery W/O Complicating Diagnoses
374 Vaginal Delivery W Sterilization &/Or D&C
375 Vaginal Delivery W O.R. Proc Except Steril &/Or D&C

EAS-IV — MHS-wide standard data repository which combines financial, personnel, and workload information for executive decision making.

ERSA — *External Resource Sharing Agreement* - allows military providers to treat TRICARE beneficiaries in civilian health care settings. Authorized costs associated with the use of civilian facilities are cost-shared through TRICARE.

EOS — *Economies of Scale* - A decrease in the per unit cost of production as a result of producing large numbers of the good.

GMF — *Global Maternity Fee* - obstetrical services reimbursed as an all-inclusive charge which includes all professional services normally provided for routine antepartum care, vaginal delivery (with or without episiotomy, or forceps or breech delivery) and postpartum care.

Product Line — Type of care based on Major Diagnostic Categories (MDC) and DRG. The Standard Inpatient Data Record uses the following conventions to assign product line to inpatient encounters:

OB = Obstetrics (MDC 14 or 15)
MDC 14: Pregnancy, Childbirth, and the Puerperium
MDC 15: Newborns and Other Neonates with Conditions Originating in Perinatal Period
S = Surgical (Surgical DRGs)
M = Medical (Medical DRGs)
MH = Mental Health (MDC 19 or 20)
MDC 19: Mental Diseases and Disorders,
MDC 20: Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental Disorders

RWP — *Relative Weighted Product* - a DoD measure of workload credit derived from biometric dispositions weighted by CHAMPUS DRG weights. The number of RWPs is a measure of the relative resource consumption of a patient's hospitalization as compared to that of other patients.

Appendix C: Model Calculations

Table C1

Calculations of three most expensive models

MTF expenses	**NHCP**	**ERSA 100% GMF**	**NHCL**
Ambulatory			
Clinician's Salary	$159,432	$116,064	$104,237
Lab	$102,200	$124,000	$60,154
Other Ancillary	$120,085	$145,700	$36,267
Other Salary	$335,216	$406,720	$119,574
Pharmacy	$85,337	$103,540	$53,155
Radiology	$41,902	$50,840	$8,364
Other Costs	$336,749	$408,580	$235,313
additional OB staff	$0	$0	$0
subtotal	$1,180,921	$1,355,444	$617,065
Inpatient			
Clinician's Salary	$242,725	$0	$163,680
Direct Cost	$137,459	$0	$885,360
Lab	$36,792	$0	$32,860
Other Ancillary	$538,083	$0	$367,040
Other Salary	$2,611,721	$0	$837,620
Radiology	$3,577	$0	$1,240
Support	$967,323	$0	$1,159,400
Surgical	$237,615	$0	$326,120
subtotal	$4,775,295	$0	$3,773,320
Network expenses			
Institutional charges	$417,673	$2,375,755	$0
Global Maternity Fee	$198,354	$1,128,252	$0
Other Professional Charges	$20,424	$0	$0
subtotal	$636,451	$3,504,007	$0
Grand Total	$6,592,667	$4,859,451	$4,390,385

Table C2

Calculations of three least expensive models

MTF expenses	**ERSA 0% GMF**	**NHCL-mix**	**network**
Ambulatory			
Clinician's Salary	$193,440	$14,963	$0
Lab	$124,000	$8,635	$0
Other Ancillary	$145,700	$5,206	$0
Other Salary	$406,720	$17,165	$0
Pharmacy	$103,540	$7,630	$0
Radiology	$50,840	$1,201	$0
Other Costs	$408,580	$33,779	$0
additional OB staff	$141,331	$0	$0
subtotal	$1,574,151	$88,579	$0
Inpatient			
Clinician's Salary	$0	$23,496	$0
Direct Cost	$0	$127,092	$0
Lab	$0	$4,717	$0
Other Ancillary	$0	$52,688	$0
Other Salary	$0	$120,239	$0
Radiology	$0	$178	$0
Support	$0	$166,430	$0
Surgical	$0	$46,814	$0
subtotal	$0	$541,654	$0
Network expenses			
Institutional charges	$2,375,755	$2,034,719	$2,375,755
Global Maternity Fee	$0	$966,293	$1,128,252
Other Professional Charges	$0	$99,497	$116,174
subtotal	$2,375,755	$3,100,509	$3,620,180
Grand Total	$3,949,906	$3,730,742	$3,620,180

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